

U. S. Army Corps of Engineers

**St. Louis Riverfront - Meramec River
Basin Ecosystem Restoration Feasibility
Study with Integrated Environmental
Assessment**

Draft - 2018

**Appendix D
Clean Water Act
404(b)(1) Evaluation**

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APPENDIX D

Clean Water Act 404(b)(1) Evaluation

Table of Contents

A. Project Description	1
1. Location.....	1
2. General Description	1
3. Authority and Purpose.....	1
4. General Description of Dredged and Fill Material	2
5. Description of the Proposed Placement Sites.....	3
6. Description of the Placement Method	3
B. Factual Determinations	3
1. Physical Determinations	3
a. Substrate Elevation and Slope.	3
b. Sediment Type.	3
c. Excavated/Fill Material Movement.....	4
d. Physical Effects on Benthos.	4
e. Actions Taken to Minimize Impacts.....	4
2. Water Circulation, Fluctuation, and Salinity Determinations	4
a. Water.	4
b. Current Patterns and Circulation.	5
c. Normal Water Level Fluctuation.....	5
d. Salient Gradient.	5
e. Actions Taken to Minimize Impacts.....	5
3. Suspended Particulate/Turbidity Determinations	5
a. Expected Changes in Suspended Particles and Turbidity Levels in Vicinity of Placement Site.....	5
b. Effects on Physical and Chemical Properties of the Water Column	5
c. Effects on Biota	6
4. Contaminant Determinations	6
5. Aquatic Ecosystem and Organism Determinations	7
a. Effects on Plankton	7
b. Effects on Benthos	7

- c. Effects on Nekton..... 7
- d. Effects on Aquatic Food Web..... 7
- 6. Effects on Special Aquatic Sites 7
 - a. Sanctuaries and Refuges..... 7
 - b. Wetlands, Mud Flats, and Vegetated Shallows. 7
 - c. Threatened and Endangered Species. 7
 - d. Other Wildlife..... 8
- 7. Proposed Placement Site Determinations 8
 - a. Mixing Zone Determinations 8
 - b. Determination of Compliance with Applicable Water Quality Standards. 8
 - c. Potential Effects on Human Use Characteristics..... 8
- 8. Determination of Cumulative Effects on the Aquatic Environment 8
- 9. Determination of Secondary Effects on the Aquatic Ecosystem 8
- C. Findings of Compliance or Non-Compliance with the Restrictions on Discharge 9**

A. Project Description

1. Location.

The Meramec River watershed, including its two major tributaries, the Big River and the Bourbeuse River, are located in east-central Missouri southwest of St. Louis. The study area for the *Meramec River Ecosystem Restoration Feasibility Study* is defined as that portion of the Meramec River and its watershed, including the Big River, located within Jefferson and St. Louis Counties of Missouri.

2. General Description

The purpose of the St. Louis Riverfront, Meramec River Basin Ecosystem Restoration Feasibility Study (Study) is to determine the National Ecosystem Restoration (NER) plan that addresses the degradation of the aquatic ecosystem and altered geomorphic characteristics within the authorized portion of the Meramec River Basin caused by human-induced modifications. The purpose of this draft feasibility study with integrated environmental assessment (EA), including the draft unsigned Finding of No Significant Impact (FONSI), is to assess the environmental effects of a reasonable range of alternatives or actions taken by the U.S. Army Corps of Engineers (USACE), including the No Action Plan, prior to making decisions. The need for this Study is demonstrated by the large number of local, state and Federal activities taking place in the study area. Coordination of this feasibility study with larger Meramec River Basin planning efforts allows for a more comprehensive and complete federal ecosystem restoration plan.

The need for Federal action stems from the variety of environmental problems that are impacting the Meramec River Basin. Several of these problems are interrelated and indirectly affect each other. The key factors identified as adversely affecting the Meramec River Basin's natural structure and function of its rivers and its floodplain are excess contaminated sediment from historic mining practices, altered hydrology, altered riparian corridor, and degradation of aquatic habitat, including ecologically significant freshwater mussel habitat. This feasibility study is being closely coordinated with the agencies involved with the remediation and restoration efforts described below. These interagency partnerships and collaboration are essential to developing and implementing a comprehensive plan to address the full suite of problems in the Big and Meramec River watersheds. Concurrently working these efforts allows USACE and the Missouri Department of Natural Resources (MoDNR) to leverage resources with the other partners (Natural Resource Damage Assessment and Restoration (NRDAR) trustees, The Nature Conservancy (TNC), U.S. Environmental Protection Agency (USEPA), and the U.S. Fish and Wildlife Service (USFWS)) to provide the water-resources solutions to restore the ecosystem structure and function of the Meramec River Basin.

3. Authority and Purpose

The objective of USACE feasibility studies is to investigate and recommend solutions to water resources problems. Prior to the USACE launching a civil works feasibility study, it must be authorized by Congress and subsequently Federal money appropriated.

The Meramec River Basin Ecosystem Restoration Feasibility Study was authorized by a 21 June 2000 Resolution by the Committee on Transportation and Infrastructure, U.S. House of Representatives, Docket 2642:

Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That the Secretary of the Army is requested to review the report of the Chief of

Engineers on the Mississippi River, between Coon Rapids Dam and the mouth of the Ohio River, published as House Document 669, 76th Congress, 3rd Session, and other pertinent reports to determine if improvements along the Mississippi River and its tributaries in St. Louis City, St. Louis County, and Jefferson County, Missouri, and Madison County, St. Clair County, and Monroe County, Illinois, are advisable at the present time in the interest of public access, navigation, harbor safety, off-channel fleeting, intermodal facilities, water quality, environmental restoration and protection, and related purposes.

The authority allows the Corps to investigate and recommend solutions in the portions of the Meramec River Basin that lie within the designated geographical scope.

4. General Description of Dredged and Fill Material

The construction of the proposed plan will require mechanical excavation and hauling of an estimated total of 292,200 cubic yards (CY) of material within the study area. Substrate samples within the study area indicate the material is a silt-sand mixture. Clean Water Act, Section 401 guidelines do not require elutriate testing or sieve analyses where mechanical excavation is used for sediment removal; therefore, the Corps has not included these in this study.

The plan will also require an estimated total of 343, 400 tons (TN) of clean riprap to construct proposed project features. The project will result in 14 acres (AC) of tree clearing for construction access. The excavated material will be disposed of off-site. Refer to Table 1 for further details on the quantities for excavation and tree clearing.

Table 1. Excavation and Tree Clearing Data Summary*

Feature Type	Site Location	Excavation (CY)	Tree Clearing (AC)
Bank Instability	BI-B-62.5		0.1
	BI-B-54.8	7,060	0.2
	BI-B-52.0		0.6
	BI-B-49.8		2.5
	BI-B-48.5		1.4
	BI-B-44.5		1.0
	BI-B-38.0		0.1
	BI-B-32.2		0.5
	BI-B-14.5		1.0
	BI-B-13.5		0.3
	BI-B-09.2		0.2
	BI-B-05.0		0.7
Sediment Capture	SC-B-62.5	140,900	0.5
	SC-B-31.0		3.5
	SC-B-25.5		-
	SC-B-18.6		-
	SC-B-14.5		-
	SC-B-9.2		0.9
Sediment Removal Bars	SRB-B-74.5	3,360	-
	SRB-B-62.5	1,720	-
	SRB-B-38.0	5,440	-
	SRB-B-33.9	10,420	-

Bedload collector	BC-B-74.8		0.1
	BC-B-67.9		0.1
	BC-B-61.5		0.1
	BC-B-55.1		0.1
	BC-B-30.2		0.1
	BC-B-19.6		0.1
Excavation	Exc-B-30.2	22,160	0.1
	Exc-B-19.6	29,360	0.1
	Exc-B-14.5	22,120	0.1
	Exc-B-10.2	21,840	0.1
Grade Control	GC-B-30.2	3,150	-
	GC-B-19.5	15,420	-
	GC-B-8.5	9,350	-

*refer to main report for description of site locations

5. Description of the Proposed Placement Sites

All excavated material would be transported off-site for disposal. Placement sites were selected based on the following:

- Avoidance of threatened and/or endangered bat roosting habitat
- Avoidance of utilities
- Following natural contours
- Minimizing footprint for clearing
- No impact to the floodplain
- No impact to adjacent landowners
- Concurrence from State and Federal sponsors
- Approved USEPA facility, if applicable

6. Description of the Placement Method

Mechanically excavated material will be placed onto trucks and hauled off-site.

Riprap placement for the rock structures will be transported via truck then placed mechanically.

B. Factual Determinations

1. Physical Determinations

a. Substrate Elevation and Slope.

The study area is one of the most rugged regions of the Midwest. The Meramec River Basin lies primarily within the Salem Plateau subdivision of the Ozark Plateau, with the lower Meramec River located within the Central Lowland Region. The proposed project measures are located within the Big River with land elevations ranging from 435 feet above sea level at the confluence with Meramec to 1,740 feet in the headwaters at Buford Mountain. Topography varies from wide ridges and gentle slopes to natural ridges, steep slopes and bluffs.

b. Soil Type.

Within the Big River watershed, soils on ridge tops and slopes are highly erodible, especially when disturbed, while upland soils are moderately shallow and consist of combination of loess and residuum derived from in-place weathering of dolomite. The higher elevations of these soils tend to be clayey

with high chert content, thin, droughty, infertile and stony. In the river bottoms, very fertile silt-loam (0-2% slope) developed from alluvium has been deposited over cherty gravel. These soils are deep to very deep (greater than 60 inches), well drained and prone to flooding occasionally or frequently. On foot slopes, side slopes and sloping point ridges the soils are also silt loams (5-14%) and are moderately well-drained. Forty-seven different soil series are located within the study area, with the most common soil series being Sonsac (14% of the entire study area).

Sonsac gravelly silt loam, 15 to 40 percent slopes (73201): This soil type is found on back slopes of hills with the parent material of gravelly colluvium over clayey residuum weathered from cherty limestone. It is moderately deep (20 to 40 inches), well drained and low organic matter content (USDA 1999).

c. Excavated/Fill Material Movement.

Excavated material placement sites are in areas located within the state of Missouri and disposal facilities approved by USEPA to accept heavy metal-laden material, if applicable. Assumption now is all excavated material will be hauled off-site. Re-evaluation during planning, engineering and design is expected.

Rock placement should experience minimal material movement. Adequate rock size is proposed to reduce settling and material movement during high flow events.

d. Physical Effects on Benthos.

Any immobile benthos present at the placement site would be buried as a result of construction activities. With the increase in woody structure and rock, benthic organisms are expected to quickly recolonize.

e. Actions Taken to Minimize Impacts.

The construction footprint was kept as small as possible to minimize impacts to the benthic community. Construction materials to be used are physically stable and clean, reducing the chances for impacting the river. Mechanical excavation prevents excess water runoff back into the river and reduces instability by keeping the material consolidated. Tree plantings, ground cover and erosion control materials will be installed following dirt work. Additionally, best management practices for construction would be enforced.

2. Water Circulation, Fluctuation, and Salinity Determinations

a. Water.

No significant differences in water chemistry are expected following proposed project construction, and no violations of applicable state water standards are anticipated. The rock materials are inert material that would have little effect on water chemistry. Odor, taste, pH, temperature and dissolved gas changes would not. Turbidity (as measured by total suspended solids) is expected to temporarily increase during construction; however, in the long-term project features are expected to improve with constructed features by reducing bank line inputs of suspended sediments. Best management practices would be implemented during construction. The construction should not impair the aquatic ecosystem's capability to sustain life, or reduce the suitability of the Big River for aquatic organisms, human consumption, recreation or aesthetics.

b. Current Patterns and Circulation.

Shallow water placement of rock and willow stakings could have a minor effect on flow patterns in the immediate vicinity of the structures. River training structures and grade control structures were designed to improve the hydraulics of the river. The construction of these features is expected to improve water movement throughout the study area.

c. Normal Water Level Fluctuation.

No changes in normal water level fluctuations are anticipated to result from the project.

d. Salient Gradient.

This consideration is not applicable in the study area of the proposed project.

e. Actions Taken to Minimize Impacts.

The construction footprint was kept as small as possible and design of river training structures and alignment were informed through hydraulic modeling to minimize any potential for adverse effects to water circulation and fluctuation. Best management practices for construction would be enforced.

3. Suspended Particulate/Turbidity Determinations

a. Expected Changes in Suspended Particles and Turbidity Levels in Vicinity of Placement Site.

Suspended solids and turbidity values would be expected to temporarily increase during excavation and placement; however, best management practices would be implemented. A return to ambient conditions should occur shortly after completion of construction. Project features are designed to reduce suspended sediments, so the project should result in long-term beneficial reductions to suspended solids and turbidity. Best management practices would be implemented during construction.

b. Effects on Physical and Chemical Properties of the Water Column

Light Penetration.

The study area may have short-term adverse impacts during construction due to turbidity plumes. Following construction, turbidity and associated light penetration should return to pre-construction or improved levels as a result of the constructed features' intended purpose to reduce suspended sediments.

Dissolved Oxygen (DO).

Placement of excavated material should have no short- or long-term adverse impacts to DO levels. Aquatic features should help to maintain DO in the study area at levels (5mg/l minimum) suitable for year-round fish habitat.

Toxic Metals and Organics.

No increase in contaminants in the aquatic environment are anticipated from the placement of fill material. Material placed as part of the project will meet Section 404 Clean Water Act, Missouri Regional Guidelines for pollution prevention (http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/nationwidepermits/2017/2017NWP_MO_RegCon.pdf?ver=2017-03-17-114205-543) as well as comply with the Missouri Water Quality Standards defined within 10 CSR 20-7.031. Excavated material would be transported and disposed off-site.

Aesthetics.

Temporary increases in suspended sediments would have a minor short-term impact on aesthetics in the study area. Changes to aesthetics as related to placement of rock structures, sediment basins and operation and maintenance of bed collectors may result in minimal adverse effects to aesthetics. In some cases, the placement of rock and revegetation of eroding bank may result in increased site aesthetic, as compared to existing raw and eroded bank conditions. The Corps will consider site-specific strategies for minimizing impacts to aesthetics during final design and placement of these features.

c. Effects on Biota

Minor disturbances to organisms present in the construction zone could occur as a result of fill activity and excavating. These disturbances are short-term and are off-set by the overall functional lift to the local aquatic and riparian ecological communities. The overall long-term benefits to biota and function in the study area and the river system are demonstrated in Table 2. Refer to Chapter 4-*Environmental Effects*, and Chapter 5-*Cumulative Effects* of the Feasibility Study with Integrated Environmental Assessment for more details.

Table 2. Management Measures that Restore Process and Area of Restored Process

Management Measure	Process Restored	Area of Restored Process
Bankline Restoration	Stream geomorphology; suspended sediment reduction	Footprint plus area in which the measure has influence downstream
Tree Planting	Habitat connectivity, forest structure and structure	Footprint plus area in which the measure has an influence on forest canopy cover, species or composition; or reproduction, rearing and foraging habitat.
Grade Control	Hydraulics; stream geomorphology	Footprint plus area in which the measure has influence downstream
Sediment Removal - Bars	Stream geomorphology; contaminated bedded sediment reduction	Footprint plus area in which the measure has influence downstream
Sediment Capture Basins	Contaminated sediment reduction	Footprint plus area in which the measure has influence downstream
Bedload Collectors	Contaminated sediment reduction	Footprint plus area in which the measure has influence downstream
Excavation	Contaminated sediment reduction; stream geomorphology	Footprint plus area in which the measure has influence downstream

4. Contaminant Determinations

No contaminants would be excavated that would exceed the USEPA standards in identified substrates. Possible introduction by equipment or construction-related contaminants would be controlled by adherence to runoff monitoring plans during construction activity. No additional toxic material would be introduced to the area over ambient conditions as a result of construction activities. Rock riprap

would be clean, uncontaminated stone from an approved source in compliance with the Clean Water Act, Section 404 Missouri Regional Condition #4 and Section 401 Water Quality Certification Condition #5.

5. Aquatic Ecosystem and Organism Determinations

a. Effects on Plankton

Only short-term and minimal effects are anticipated to occur as a result of excavated and fill activity. No significant impacts to plankton are expected.

b. Effects on Benthos

No significant impacts to benthos at the placement site or at the location of mechanical excavating are anticipated. For the most part, aquatic substrates would be affected incidentally to adjacent construction activities. Aquatic substrates would be directly affected by mechanical excavating. These substrates would eventually be covered with material of similar character. Re-colonization of benthic organisms should occur quickly.

c. Effects on Nekton.

No adverse impacts to nekton are expected and the proposed project would substantially improve the quality of the aquatic habitat in the study area. The proposed project will reduce suspended sediment, bedded sediment and, in turn, reduce contaminated sediments. Constructed features would also restore hydraulics of the river improving the overall aquatic habitat into the future.

d. Effects on Aquatic Food Web.

The loss of the benthic organisms within the footprint of the riprap bankline production and river training structures should not cause any significant impact to any level/segment of the aquatic food web or disrupt the flow of energy between trophic levels. This small benthic loss should not cause any decrease in the overall productivity and nutrient export capability of the ecosystem.

Improvements in the aquatic habitat through reduction of suspended and bedded sediments, channel stability and vegetation plantings should increase primary and secondary production in the study area. This increase in production should lead to an increased forage base for fish and wildlife.

6. Effects on Special Aquatic Sites

a. Sanctuaries and Refuges.

The study area is not located in any sanctuaries or refuges; therefore, the proposed project will not impede any sanctuaries or refuges.

b. Wetlands, Mud Flats, and Vegetated Shallows.

Wetlands within the proposed project area may be impacted with the construction of some project features (i.e., sediment collection basins) which would account for approximately 154 acres; however, the impacts would be offset by reforestation of approximately 675 acres of forested wetlands. Overall the wetland impacts would be outweighed by the benefits to not only the aquatic habitat but the overall ecosystem within the study area.

c. Threatened and Endangered Species.

Presence of, or use by, endangered and threatened species is discussed in the Feasibility Study with Integrated Environmental Assessment. No adverse impacts are expected to result from the proposed

project. Refer to Chapter 4-*Environmental Effects* and Chapter 5-*Cumulative Effects* of the Feasibility Study with Integrated Environmental Assessment as well as the draft Biological Assessment for more details. In accordance with Section 7 Endangered Species Act (ESA) guidelines, USACE concluded a determination of “*May Affect, Not Likely to Adversely Affect*” for the following species: gray bat (*Myotis grisescens*), Indiana bat (*M. sodalis*), northern long-eared bat (*M. septentrionalis*), pink mucket (*Lampsilis abrupta*), scaleshell (*Leptodea leptodon*), sheepsnose mussel (*Plethobasus cyphus*), snuffbox mussel (*Epioblasma triquetra*), and spectaclecase (*Cumberlandia monodonta*). This determination includes implementation of conservation measures currently being coordinated between USFWS and the USACE. The proposed project will have *No Effect* on decurrent false aster (*Boltonia decurrens*) and running buffalo clover (*Trifolium stoloniferum*). Full compliance with ESA will occur prior to construction.

d. Other Wildlife.

Some short-term displacement of wildlife in the immediate vicinity of construction activities is anticipated. Wildlife species which utilize forested and non-forested wetland habitats should benefit from the proposed action in the long-term.

7. Proposed Placement Site Determinations

a. Mixing Zone Determinations

Discussions pertaining to turbidity and suspended particulates are summarized above, as well as contaminants. A small amount of fine-grained material could migrate from the placement sites and become diluted with adjacent main channel border flow. Placement of material to help re-slope banklines and around river training structure anchor points would result in temporary localized increases in suspended material. The use of mechanical excavating should help to minimize these effects.

b. Determination of Compliance with Applicable Water Quality Standards.

This Clean Water Act Section 404(b)(1) provides the necessary compliance required by law. Section 401 Water Quality certification in compliance with the Clean Water Act and all other permits necessary for the completion of the project would be obtained prior to project construction.

c. Potential Effects on Human Use Characteristics

Implementation of the proposed project will have no significant adverse effects on municipal or private water supplies, recreational or commercial fisheries, water-related recreation or aesthetics, parks, national monuments or other similar preserves.

8. Determination of Cumulative Effects on the Aquatic Environment

Although minor short-term construction-related impacts are anticipated to local fish and wildlife populations, no negative cumulative impacts to fish and wildlife have been identified. From a systemic approach, the proposed project would result in positive long-term benefits to riverine and riparian forest habitats located within the study area and would benefit the restoration of the Big River watershed. Refer to Chapter 5-*Cumulative Effects* in the Feasibility Study with Integrated Environmental Assessment for more details.

9. Determination of Secondary Effects on the Aquatic Ecosystem

No significant secondary effects should result from construction of the proposed project.

C. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

The District's Project Delivery Team concludes that the proposed project meets the conditions of Section 404 of the Clean Water Act (CWA). No significant adaptations of the 404(b)1 guidelines were made relative to this evaluation. An array of alternatives, including the No Action Plan, were evaluated for habitat benefits and costs, meeting project objectives and for completeness, effectiveness, efficiency and acceptability.

1. Certification under Section 401 of the Clean Water Act would be obtained from the Missouri Department of Natural Resources, where applicable.
2. The proposed fill activity is in compliance with the Applicable Toxic Effluent Standards of Prohibition under Section 307 of the Clean Water Act.
3. Prior to construction, full compliance with the Endangered Species Act would be documented.
4. The project is situated along an inland freshwater river system. No marine sanctuaries are involved or would be affected by the proposed action.
5. No municipal or private water supplies would be affected by the proposed action, and no degradation of waters of the United States is anticipated to result from the proposed action. The proposed construction activity would not have a significant adverse effect on human health and welfare, recreation and commercial fisheries, plankton, fish, shellfish, wildlife or special aquatic sites. No significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems are expected to result. The proposed construction activity would have no significant adverse effects on aquatic ecosystem diversity, productivity and stability. No significant adverse effects on recreational, aesthetic, and economic values would occur.
6. The materials used for construction would be chemically and physically stable and non-contaminating.
7. The proposed action is in compliance with Section 404(b)(1) of the Clean Water Act, as amended. The proposed action would not significantly impact water quality.

If construction activities are not completed within the allotted time, the team will then re-evaluate the project's Section 404 compliance status and will coordinate the project with the District's Regulatory Branch. The project will be in full compliance with the current Clean Water Act regulations prior to any construction and activities.

(Date)

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